

**RESPONSE TO COMMENTS  
DRAFT NPDES PERMIT AK-002155-5  
CITY OF KODIAK, ALASKA  
WASTEWATER TREATMENT PLANT**

A draft National Pollutant Discharge Elimination System (NPDES) permit for the City of Kodiak, Alaska Wastewater Treatment Plant (WWTP) was issued for public notice on April 23, 1999. The Public Notice initiated a 30-day public comment period. EPA received comments from the permittee and the Alaska Department of Environmental Quality; No other comments were received. The following summarizes the substantive comments and EPA's response.

**Comment.** Effluent Limitations - Fecal Coliform Bacteria. The commentor stated that the fecal coliform limits have been revised by the Alaska Dept. of Environmental Conservation as part of their Certificate of Reasonable Assurance to be: Monthly Average - 200,000 FC/100mL, Weekly Average - None, and Maximum Daily - 500,000 FC/100mL. In addition, the commentor stated that the monthly average limit needs to be calculated as the geometric mean to be consistent and comparable to the Alaska State Water Quality Standard and requested that footnote 2 to Table 1 be modified to "Monthly average fecal coliform concentrations shall be calculated as the geometric mean of all samples collected within a month. Reporting of violations of the maximum daily limit is required within 24-hours."

**Response.** In the Preliminary Certificate of Reasonable Assurance (April 20, 1999), the Alaska Dept. of Environmental Conservation required that the fecal coliform bacteria in the secondary treated effluent discharged for the City of Kodiak Wastewater Treatment Facility shall not exceed a 30 day average of 100,000 per 100 milliliters of sample, a seven day average of 150,000 per 100 milliliters of sample, and the daily maximum shall not exceed 200,000 per 100 milliliters of sample (page 2, stipulation 3).

The facility commented to ADEC on the fecal coliform limits in the Preliminary Certificate of Reasonable Assurance and ADEC agreed to increase the limits to **200,000 FC/100mL** for a monthly average and **500,000 FC/100mL** for a daily maximum with no average weekly limit. The authority for ADEC to provide these limits are based on the most effective treatment technology and economic methods achieved by the facility. Using these limits would require a mixing zone **dilution of 14,286:1.**

The facility provided a mixing zone analysis model to ADEC that resulted in a dilution of 2,744:1. The model assumed that the 90th percentile concentration was discharged, no fecal coliform die-off occurs during transport to the mixing zone boundary, and no turbulent mixing occurs during transport. This dilution resulted in a mixing zone that was 2,000 meters long by 400 meters wide. However, ADEC indicated that a more appropriate model would use the assumptions that the bacterial die-off rate would be 12t90 and countered that a mixing zone of 1,600 meters long by 400 meters wide would ensure water quality standards were met at the edge of the mixing zone. This modified mixing zone was modeled by EPA and the dilution was determined to be 2,422:1.

Using the dilution of 2,744:1 from the facility's model, fecal coliform effluent limits were calculated as follows:

Dilution Ratio (DR)=	<b>2,744:1</b>
Wasteload Allocation (WLA)=criteria*DR=	54,880 geo mean 38,416 median 117,992 10% MZ 109,760 10% shore 548,800 Max
Long Term Average (LTA)= $WLA * \exp(0.5\sigma_4^2 - z\sigma_4)$ = $\sigma_4^2 = \ln(CV^2/4 + 1) = 0.29$ ; $\sigma_4 = 0.54$ ; $CV = 1.2$ ; $z = 2.326$	18,067 LTAc geo mean 12,647 LTAc median 38,844 LTAA 10% MZ 36,134 LTAA 10% shore 180,673 LTAA Max
Lowest LTA=	12,647
Maximum Daily Limit (MDL)= $LTA * \exp(z\sigma - 0.5\sigma^2)$ = $\sigma^2 = \ln(CV^2 + 1) = 0.85$ ; $\sigma = 0.92$ ; $CV = 1.2$ ; $z = 2.326$	<b>70,300 FC/100mL</b>
Average Monthly Limit (AML)= $LTA * \exp(z\sigma_n - 0.5\sigma_n^2)$ = $\sigma_n^2 = \ln(CV^2/n + 1) = 0.29$ ; $\sigma_n = 0.54$ ; $CV = 1.2$ ; $z = 2.326$	<b>38,400 FC/100mL</b>

Using the dilution of 2,422:1 from the EPA's model, fecal coliform effluent limits were calculated as follows:

Dilution Ratio (DR)=	2,422:1
Wasteload Allocation (WLA)=criteria*DR=	48,440 geo mean 33,908 median 104,146 10% MZ 96,880 10% shore 484,400 Max
Long Term Average (LTA)= $WLA * \exp(0.5\sigma_4^2 - z\sigma_4)$ = $\sigma_4^2 = \ln(CV^2/4 + 1) = 0.29$ ; $\sigma_4 = 0.54$ ; $CV = 1.2$ ; $z = 2.326$	15,947 LTAc geo mean 12,809 LTAc median 34,287 LTAA 10% MZ 31,894 LTAA 10% shore 159,472 LTAA Max
Lowest LTA=	12,809
Maximum Daily Limit (MDL)= $LTA * \exp(z\sigma - 0.5\sigma^2)$ = $\sigma^2 = \ln(CV^2 + 1) = 0.85$ ; $\sigma = 0.92$ ; $CV = 1.2$ ; $z = 2.326$	<b>71,200 FC/100mL</b>
Average Monthly Limit (AML)= $LTA * \exp(z\sigma_n - 0.5\sigma_n^2)$ = $\sigma_n^2 = \ln(CV^2/n + 1) = 0.29$ ; $\sigma_n = 0.54$ ; $CV = 1.2$ ; $z = 2.326$	<b>38,900 FC/100mL</b>

Using either dilution model would require disinfection of the effluent prior to discharge. Since the facility indicated that it will not be chlorinating and ADEC certified that the limits of 200,000 FC/100mL monthly average and 500,000 FC/100mL were the appropriate limits to comply with

Alaska water quality standards, EPA will incorporate these performance-based limits into the final permit.

The Alaska State Water Quality Standards (18 AAC 70.020(b)(2)), as amended through January 22, 1999) states that fecal coliform 30-day averages are based on the mean of a minimum of 5 samples. The water quality standards at 18 AAC 70.990(34) defines “mean” for fecal coliform analysis as a logarithm (or geometric) mean. However, the standards for wastewater disposal at 18 AAC 72.990(15) state that adequate disinfection is based on the arithmetic mean of the values collected during the required time period. The arithmetic mean is the sum of the values divided by the number of values  $[(a_1 + a_2 + \dots + a_n)/n]$  whereas the geometric mean is the  $n$ th root of the product of the values where  $n$  represents the number of samples  $[(a_1 * a_2 * \dots * a_n)^{1/n}]$ . EPA discussed this conflict with ADEC and it was decided that the geometric mean should be used for consistency with the water quality standards. Therefore, the permit will be changed to reflect this determination.

**Comment.** Effluent Limitations - Loadings for BOD and TSS. The commentor stated that the loadings for BOD and TSS be reviewed since their calculations show higher loadings than those given in the draft permit.

**Response.** The loadings in the draft permit were based on an annual average design flow of 3.2 mgd. EPA agrees that the maximum monthly design flow of 4.7 could be used to calculate the monthly average and weekly average loadings, and the maximum day design flow of 6.2 could be used to calculate the maximum daily flow. The loadings for BOD and TSS will be changed to the following: Monthly Average - 1,200 lbs/day, Weekly Average - 1,800 lbs/day, and Maximum Daily - 3,100 lbs/day.

**Comment.** Effluent Limitations - Dissolved Oxygen (DO). The commentor stated that the WWTP effluent is typically in the range of 2-4 mg/L and that it is rapidly diluted over 100:1 within meters of the discharge to Woody Island Channel. Dissolved oxygen was modeled based on a minimum ZID of 86:1 and assuming effluent DO of 2 mg/L (proposed effluent DO limit) and receiving water DO of 4 mg/L (minimum standard for marine waters). The model showed that the dissolved oxygen deficit would be 0.03 mg/L, which is not measurable with dissolved oxygen sensors and is considered not detectable. The commentor requested that the Minimum Daily Limit be revised to 2 mg/L.

**Response.** The Alaska Dept. of Environmental Conservation allowed a mixing zone for dissolved oxygen in the Preliminary Certificate of Reasonable Assurance. The assumption the commentor used for receiving water DO concentration is not protective of all designated uses for this waterbody. The State water quality standards for Water Supply seafood processing require that DO must be greater than or equal to 5 mg/L. EPA modeled dissolved oxygen using a ZID of 86:1, effluent DO of 2.0 mg/L, and receiving water DO of 5 mg/L. The model indicated that the dissolved oxygen deficit would be approximately 0.03 mg/L, which is what the commentor predicted. Therefore, EPA agrees with this comment and will change the final permit accordingly.

**Comment.** Effluent Limitations - Total Residual Chlorine. The commentor requested that the effluent limit for total residual chlorine be revised to 0.1 mg/L, the actual analytical quantification limit (as stated in footnote 3 of Table 1).

**Response.** Effluent limits in permits are required to protect designate uses and meet water quality standard. However, there are instances where analytical methods are not available to quantify these limits. When this occurs, EPA's guidance recommends the use of the method detect level (MDL) as the compliance level for "no discharge" and the minimum level (ML) as the compliance level for when a limit occurs between the MDL and the ML. This does not mean that the MDL or ML is the effluent limit, but rather the compliance level where EPA is satisfied that this limit is met. In the current permit, the limit for total residual chlorine is listed as "below detectable levels based upon the DPD or amperometric methods. The facility indicated that their MDL for chlorine on their laboratory equipment is in the range of 0.020 to 0.050 mg/L. Since the facility has stated that they are going to cease disinfection of the secondary effluent following completion of the plant upgrade, the permit limit shall remain at "no detect." Therefore, the permit compliance level for total residual chlorine will be modified to 0.050 mg/L to ensure that the upper detect range of the laboratory equipment will not impose a violation. Additionally, footnote 3 of Table 1 (footnote 4 in the final permit) will be modified to state: "Shall be below detectable limits prior to discharge based upon EPA approved analytical methods. Final compliance evaluation limit is 0.050 mg/L (2.6 lbs/day)."

**Comment.** Effluent Monitoring Requirements - Total Residual Chlorine. A commentor stated that the Kodiak WWTP is currently using chlorine to disinfect the effluent, but will cease disinfection following the completion of the plant upgrade. Another commentor requested that the monitoring frequency should be changed to include 2 samples per month when not chlorinating.

**Response.** EPA agrees with these comments and will change the final permit accordingly.

**Comment.** Effluent Monitoring Requirements - Ammonia. The commentor requested that the sampling frequency for effluent ammonia be changed to one time per month since there is no reasonable potential for effluent ammonia to exceed ambient criteria (based on the minimum effluent dilution of 90:1 at the ZID).

**Response.** Reasonable potential for effluent ammonia to exceed ambient criteria could not be established due to lack of data. The intent of the monitoring is to establish enough data to determine reasonable potential during the next permit re-issuance. EPA agrees that effluent monitoring of this pollutant once per month would be acceptable to establish an adequate data set. The final permit will amend ammonia monitoring to once per month.

**Comment.** Effluent Monitoring Requirements - BOD<sub>5</sub>, TSS, and Fecal Coliform Bacteria. The commentor requests that the sampling frequency for BOD<sub>5</sub> and TSS be increased to four times per month and the sampling frequency for fecal coliform be increased to four times per month.

**Response.** The monitoring requirements in the draft permit indicates a minimum number of samples that the facility must take, however, the permittee always has the option to conduct more frequent sampling. When more frequent sampling is conducted, the analyses of the additional sampling must be used in reporting effluent values on the Discharge Monitoring Report (DMR). Since the permittee asked for the increase in monitoring, the final permit will amend BOD<sub>5</sub>, TSS and fecal coliform monitoring as requested.

**Comment.** Effluent Monitoring Requirements - Nitrates and Phosphorus. The commentor stated that, based on a minimum ZID of 86:1 and assuming normal secondary effluent nitrate and phosphorus concentrations, the resulting nutrient increase from the effluent would not be detectable. Since the receiving water body is not limited for nutrients, the commentor requested that monitoring of nitrates and phosphorus be removed from the permit because there is not any basis for requiring effluent monitoring of nitrates and total phosphorus with a dilution of 90:1 in the ZID.

**Response.** EPA agrees with this comment and will change the final permit accordingly.

**Comment.** Effluent Monitoring Requirements - Metals. The commentor stated that the technical analysis of metals with the mixing zone demonstrated that the discharge does not have a reasonable potential to exceed the acute or chronic chemical criteria for metals in the receiving water. The commentor requested that the monitoring of metals be changed to two samples in the last year of the permit to supplement the six existing metals analyses presently available.

**Response.** EPA has determined that the maximum mixing zone necessary to assure attainment of water quality in the receiving water would be 54:1. Since the mixing zone allotted for metals was given at 86:1 and there are no industrial type discharges that contribute metals to the influent of the treatment plant, EPA has decided that metals monitoring of the effluent or in the receiving water is unnecessary. Metals monitoring has been removed from the permit.

**Comment.** Effluent Monitoring Requirements - Metals. The commentor stated that footnote 2 to Table 2 needs to be revised to specify total recoverable metals for these metals.

**Response.** EPA agrees with this comment, however, metals monitoring is being removed from the permit and footnote 2 has been removed.

**Comment.** Effluent Monitoring Requirements - Monitoring Location. The commentor requested that the wording of paragraph I.B.2 be changed to accurately reflect the locations of sample collection as follows: "Effluent grab samples shall be collected after the last treatment unit prior to discharge. Effluent 24-hour composite samples shall be collected at the effluent building."

**Response.** Even though the most logical monitoring point for an effluent is just prior to discharge to the receiving water, EPA agrees that 24-hour composite sampling at the effluent

building is an acceptable alternate monitoring location and will specify this alternate monitoring location in the final permit.

**Comment.** Ambient Monitoring. The commentor requested that all ambient monitoring, with the exception of fecal coliform bacteria, be removed from the permit.

**Response.** EPA agrees with this comment and will change the final permit accordingly.

**Comment.** Ambient Monitoring - Fecal Coliform Bacteria. The commentor requested that the ambient monitoring frequency for fecal coliform bacteria be revised to match the Alaska Dept. of Environmental Conservation's Certificate of Reasonable Assurance which requires monitoring in May, July, and September, with two other samplings during the remainder of the year.

**Response.** In the Preliminary Certificate of Reasonable Assurance (April 20, 1999), the Alaska Dept. of Environmental Conservation required that fecal coliform bacteria must be monitored at a frequency of once per month during the months of May, June, July, August and September, and twice during the remainder of the year (page 2, stipulation 5). The draft permit required monthly monitoring during the months of April, May, June, July, August and September, and quarterly monitoring between October and March (this equates to two sampling events since one quarter consists of October, November, and December and the second quarter consists of January, February, and March). A conversation with ADEC revealed that the commentor spoke with ADEC during the comment period and ADEC agreed to decrease the ambient monitoring to May, July, August, and two other sampling events during the remainder of the year. The permit will be modified to reflect this change.

**Comment.** Ambient Monitoring. The commentor stated that the permit requires ambient monitoring to commence the calendar month following the issuance of the permit, but the plant was currently upgrading the facility. The commentor requested that ambient monitoring begin 180 days following upgrade completion or June 1, 2000.

**Response.** EPA agrees with this comment and will change the permit to commence ambient monitoring June 1, 2000.

**Comment.** Sludge Management Requirements. The commentor stated that the Kodiak Island Borough is responsible for the operation of the municipal Landfill, and the City of Kodiak has no authority or mechanism to take steps to ensure that the Kodiak Island Borough is complying with federal standards for landfilling biosolids.

**Response.** The NPDES regulations for disposal of sewage sludge (40 CFR Part 503.4) states that the disposal of sewage sludge in a municipal solid waste landfill unit *that complies* with the requirements of 40 CFR part 258 constitutes compliance with section 405(d) of the CWA. In other words, the Kodiak WWTP can only dispose of their sewage sludge to a landfill that

complies with 40 CFR part 258. Therefore, the facility must know whether the landfill is in compliance with 40 CFR part 258 before disposing its sewage sludge there.

In the permit, paragraph I.D.1.d implements this requirement into the permit. However, EPA agrees that the wording of this paragraph is misleading and will reword the paragraph to:

“The permittee is required to dispose of sewage sludge in a municipal solid waste landfill unit that is in compliance with 40 CFR part 258.”

**Comment.** Quality Assurance Requirements. The commentor stated that they believe that the development of an extensive Quality Assurance Project Plan (QAPP) is an undue and unneeded expense. The commentor requested that the quality assurance requirements section be replaced with the following:

- “1. Permittee will update and submit the WWTP Laboratory Quality Assurance Plan within 180 days of permit issuance;
2. Laboratory methods will be conducted in accordance with 40 CFR 136 or other methods specified by EPA;
3. EPA-certified analytical laboratories will be used for all outside analyses;
4. Laboratories will be identified in all data reports submitted to EPA; and
5. Quality assurance testing performed by the Kodiak WWTP Laboratory will be reported in each annual report.”

**Response.** The federal regulations (40 CFR part 122.41(e)) states that proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. After consulting with the facility, it was agreed that the QAPP could be incorporated into the O&M manual as long as the following information was included:

1. Sample location and frequency.
2. Sample handling procedures.
3. Parameters, test methods, and detection limits.
4. Number of QC samples, spikes and replicates required for analysis (for precision accuracy).
5. Documentation requirements for the laboratory (i.e., retention time, QA/QC procedures for test methods, etc.).
6. Organizational responsibilities - who is responsible for QA/QC activities (i.e., who takes samples, who reviews the data analysis, etc.).
7. Name(s), address(es), and phone number(s) of laboratories used or proposed to be used by the permittee.

Since this information may be incorporated into the O&M manual, the due date will be June 1, 2000.

**Comment.** Operation and Maintenance Plan Review. The commentor stated that the facility upgrade will be complete in December of 1999 and that the plant startup phase will end in June of 2000. The commentor requested that the O&M plan review and revisions be specified to begin 180 days following upgrade completion or June 1, 2000.

**Response.** EPA agrees with this comment and will change the final permit accordingly.

**Comment.** Chronic Toxicity Testing. The commentor stated that the facility has conducted six chronic bioassays using marine larval development that show the No Observable Effects Concentration (NOEC) ranged from 9.6 to 35 percent effluent (or effluent dilutions of 10:1 to 3:1) and that these concentrations occur well within the 30 meter ZID. The commentor further stated that semi-annual chronic testing with three species was not necessary for the WWTP effluent. The commentor requested that the chronic bioassay testing be changed to require two tests within the last year of the permit.

**Response.** EPA agrees that semi-annual chronic testing with three species is excessive for a wastewater treatment plant with primarily domestic septage effluent. The frequency of testing will be modified to two tests in the first year after plant startup has completed and two tests in the fourth year of the permit. The test species requirement should have been for one vertebrate and one of the two listed invertebrates. The permit will be modified to require only one invertebrate species, but will list both invertebrate species options.

**Comment.** Chronic Toxicity Testing. The commentor stated that the order of paragraphs 5 and 6 appear to be reversed because the development of a TRE Work Plan would not be required or initiated unless the conditions in paragraph 6 (evidence of chronic toxicity above the trigger) were first met.

**Response.** The order of the paragraphs is correct, however the language is somewhat confusing. A TRE Work Plan is different from a TRE Evaluation. The TRE Work Plan is a map that shows the steps that the facility will take in the event of an exceedance of the trigger. A TRE Evaluation is the development of the specific steps that will be used to determine the cause of the exceedance. A TRE Evaluation is much more involved than the TRE Work Plan. EPA does agree that the permit is confusing in the requirements and will reword these paragraphs to clarify the requirements. The permit is requiring the following as a minimum TRE Work Plan:





## TRE WORK PLAN

1. Information and Data Acquisition. Collect information and analytical data pertaining to effluent toxicity.
2. Performance Evaluation. Identify the facility's methods of maximizing in-house treatment efficiency and good housekeeping practices.
3. Toxicity Identification Evaluations. Identify investigation and evaluation techniques or actions that may be used to identify potential causes/sources of toxicity, effluent variability, and treatment system efficiency.
4. Toxicity Control. Develop actions that will be taken to mitigate the impact of the discharge and to prevent the recurrence of toxicity.
5. Schedule. Develop a schedule for TRE.

**Comment.** Chronic Toxicity Testing. The commentor stated that TRE sampling every two

weeks for twelve weeks is excessive and that one additional test after failing the chronic toxicity test should be adequate.

**Response.** EPA agrees that in some instances the TRE requirement could be excessive. The permit language will be modified to allow the permittee to reduce the amount of TRE sampling after consultation with EPA.

**Comment.** Mixing Zone. The commentor stated that the mixing zone model resulted in a ZID of 86:1 for DO, metals, nutrients, pH, total chlorine, and WET, not 90:1 as indicated in the Preliminary Certificate of Reasonable Assurance. The only effect this has on the permit is the toxicity trigger will be changed from 90 TUC to 86 TUC.

The following comments were provided for the Fact Sheet, however, the Fact Sheet is issued final with the Draft Permit at the time of public notice. Where a comment for the Fact Sheet was coincided with a comment for the draft permit, the Fact Sheet comment was incorporated into the Draft Permit comment. Responses to these comments will acknowledge these comments for the administrative record, but do not affect the conditions of the permit.

**Comment.** Effluent Limitations - Mixing Zone. The commentor stated that the mixing zone description was inaccurately stated in the Fact Sheet and requested that the last two sentences of the third paragraph be revised to read: “The Zone of Initial Dilution (ZID) for compliance with WET, metals, nutrients, dissolved oxygen, and pH is a distance of 30 meters from each port along the outfall diffuser. The ZID boundary distance represents the maximum distance from the diffuser that initial dilution is completed based on a wide range of effluent flows and receiving water conditions. The minimum dilution achieved at the completion of initial dilution is 86:1 based on existing plant flow, and this dilution is used to represent the minimum ZID dilution.”

**Response.** EPA agrees with this comment, however, the Fact Sheet does reflect the mixing zone description provided in the Preliminary Certificate of Reasonable Assurance by ADEC. Since the State authorizes the mixing zone, not EPA, this comment has been forwarded to ADEC for consideration in the issuance of their Certificate of Reasonable Assurance.

**Comment.** Effluent Limitations - Temperature. The commentor stated that a ZID of 86:1 with a maximum effluent value of 15.9°C and an ambient temperature of 15.0°C (maximum allowable in State standards) would result in a temperature increase of 0.01 °C.

**Response.** The Alaska water quality standards also state that the weekly average effluent temperature is not to increase the receiving water temperature by more than 1 °C and the hourly temperature exchange rate is not to exceed 0.5 °C. The Fact Sheet stated that the effluent temperature was not likely to increase the receiving water temperature to levels that would violate the water quality standards. Therefore, EPA agrees with the comment.